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Mapping of Research Productivity of Applied and Environmental Microbiology Journal: A Bibliometric Study

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MAPPING OF RESEARCH PRODUCTIVITYOF APPLIED AND ENVIRONMENTAL MICROBIOLOGY JOURNAL: A BIBLIOMETRIC STUDY DIMENSIONS.

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Abstract – This study evaluates the Applied and Environmental Microbiology (AEM). Applied and Environmental Microbiology is a biweekly peer-reviewed scientific journal published by the American Society for Microbiology. ASM's mission is to promote and advance the microbial sciences. The present bibliometrics study was 4985 scholarly research articles published in 'Applied and Environmental Microbiology Journal, during the period 2001-2005. The collected data were analyzed with the help of 'Bibexcel tool' and Hist cite. The references were collected from Mendeley and Endnote Software. The study also applied statistical tools such as Authorship pattern, Relative Growth Rate, Collaborative Index, Degree of Collaboration, Zipf Law, and Exponential Growth Rate.

Keyword - *Bibliometrics, Web of science, Bibexcel, Applied and Environmental Microbiology, Authors productivity.*

INTRODUCTION

Bibliometric is the type of explore method; it is an emerging area of research in the Library and Information Science meadow. The term "bibliometrics" is coined from two words "biblio" and "metrics". The word biblio is derived from the combination of a Latin and Greek word biblion-means a book or paper, metrics indicates the science of metre i.e. dimension.

Applied and Environmental Microbiology is a biweekly peer-reviewed scientific journal published by the American Society for Microbiology. It was conventional in 1953 as Applied Microbiology and obtain its current name in 1975. Articles older than six months are available free of cost from the website, however, the newly in print articles within six months are available to subscribers only. According to the Journal Citation Reports, the journal has a 2014 impact factor of 3.668. The journal has been rank as one of the top 100 journals

over the past 100 years in the fields of biology and medicine. The current editor-in-chief is Harold L. Drake (University of Bayreuth).

REVIEW OF LITERATURE

Rubinandhini A and Gomathi P(2015)[1] this study focuses on the journal fromthe Annals of Library and Information Studies. This study covers the total number of 324 articles studied only the one journal with five years (2005 to 2014). This paper discusses on authorship pattern, citation analysis, Publication Efficiency Index, length of articles, relative growth rate, Distribution of year wise citation analysis, degree of collaboration, country wise distribution of publications, and time series analysis of total authored papers also.

Santhakumar R and Kaliyaperumal K (2015)[2] this study focus on the growth and development of Mobile Technology research in terms of publication output as reflected in Web of Science database. During2000–2013 a total of 10,638 publications was published in the field. The average number of publications published per year was 759.86 and the highest numbers of publications 1495 were published in 2013. Output of total publications, 9037 was produced by multiple authors and 1601 by single authors. University of California System (USA) is the highly contributed institutions with 243 publications followed by University of London (UK) with 149 publications, Florida State University System (USA), National Chiao Tung University (China) with 88 publications.

Gomathi P and Rubinandhini A (2016)[3] this study evaluates the high blood pressure research output from the year 2011-2015. The data were downloaded from web of science database which was maintained by Thomson Reuters. Total number of records was 1152. The result of such studies may be very useful for the research administrators, policy makers and funding agencies. High blood pressure is a progressive disease, signs and symptoms slowly worsen over time. There is no change to do well. The collected data were analyzed with the help of 'Bibexcel tool'. The study also applied statistical tools such as Authorship pattern, Relative Growth Rate, Citation analysis.

Rubinandhini A and Gomathi P (2018)[4] this study evaluates the Applied and Environmental Microbiology Journal (AEMJ). It is a biweekly peer-reviewed logical journal published by American Society for Microbiology. It was established in 1953 as Applied Microbiology and obtained its existing name in 1975. The American Society for Microbiology is the major single life science, society, calm of over 47,000 scientists and health professionals.

ASM's mission is to promote and shift forward the microbial sciences. The present bibliometrics study was 15291 scholarly investigate articles published in 'Applied and Environmental Microbiology periodical, during the period 2001-2015. The composed data is analyzed with the lend a hand of 'Bibexcel tool'. The references were together from Mendeley. The learning also applied statistical gear such as, block wise distribution, Key word wise analysis, and Country Collaboration and BRICS country collaboration.

Alagu A and Thanuskodi S (2019)[5] the study meant to review the Digital Literacy research productivity during the era of 1992-2011.The web of science database has used to retrieve records related to digital literacy research. The bibliographic citation retrieved data are analyzed using the Histcite Software application. Based on the retrieve data, digital literacy research publication is analyzed and interpreted. The performance of the nearly everyone productivity countries, authors, journals, language-wise, Institution –wise, keyword wise and citation reference is analyzed. Relative Growth rate and doubling time have assessed. Journal of Adolescent & Adult Literacy journal placed in the primary position with 18 records.

RESEARCH METHODOLOGY AND LIMITATION OF THE STUDY

The data for the study were retrieved from wed of science database, which is a scientific and indexing service maintained by Thomson Reuters. The Applied and Environmental Microbiology Journal research output from the year 2001-2005. For this study bibliographic detail such as author, document type, collaboration, etc. was analyzed using bibexcel and Histcite. Bibexcel is a software package used for bibliometric analysis and information visualization. The collected data were analyzed with the bib excel,Mendeley and Endnote softwares, Manual, Microsoft Excel Sheet and presented in the form of tables.

OBJECTIVES OF THE STUDY

- ✓ To find out the year wise distribution of the article, and Authorship pattern of publication.
- ✓ To examine the Single author Vs Multi authors, Prolific authors.
- ✓ To identify the Collaborative Index for research output.
- ✓ To evaluate the Degree of Collaboration output in the research.
- ✓ To calculate the Exponential Growth Rate, Language wise distribution.
- ✓ To find out the key word wise distribution of articles.
- ✓ To determine the document type distribution of Applied and Environmental Microbiology Journal research.

DATA ANALYSIS AND INTERPRETATION

Table-1 Year wise distribution of articles

S.No	Publication Year	Records	Percent	TLCS	TGCS
1	2001	847	17.0	2240	56206
2	2002	890	17.9	1913	59662
3	2003	1033	20.7	1366	61563
4	2004	1009	20.2	621	55786
5	2005	1206	24.2	109	63968
Total		**4985**	**100**	**-**	**-**

Figure -1 Year wise Distribution of Articles

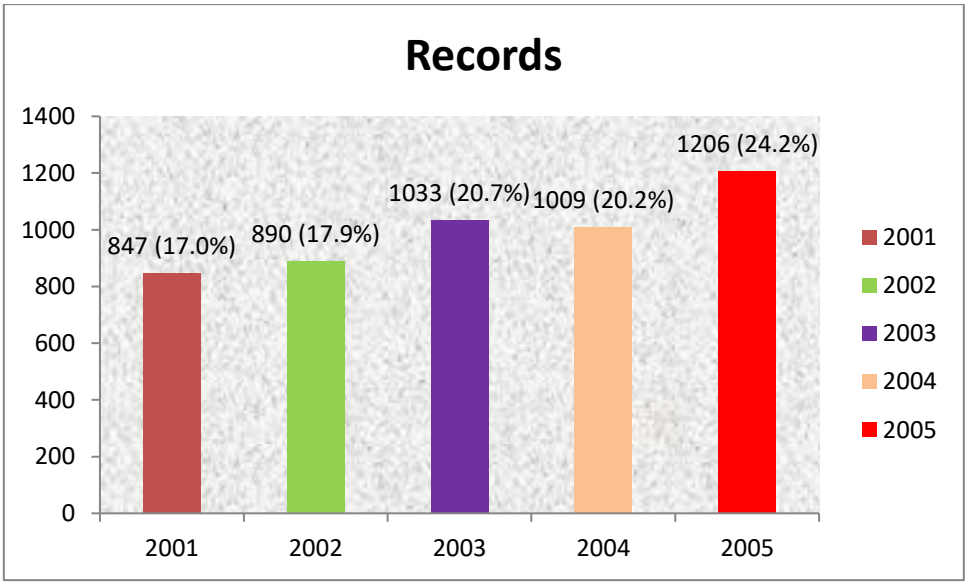

Table 1 and figure 1 shows that year wise distribution of publication of Applied and Environmental Microbiology Journal for the year of 2001 to 2005 (5 years). Total publications 4985 were published. The highest number of publications 1206 (24.2%) were published in the year 2005 followed by 2003 ie 1033 (20.7%). The 2004 were 1009 (20.2%) followed by 2002 ie 890 (17.9%). Very lowest numbers of publications were 847 (17.0%) published in the year 2001. The study reveals that the majority of the articles published in the year 2005 ie 1206 (24.2%).

Table – 2 Authorship Pattern of Publication

S. No	Authors	No. of. Publications	%
1	Single author	48	0.96
2	Two authors	631	12.67
3	Three authors	996	19.98
4	Four authors	1029	20.64
5	Five authors	885	17.75
6	Six authors	575	11.53
7	Seven authors	357	7.16
8	Eight authors	212	4.25
9	Nine authors	122	2.45
10	Ten authors	55	1.10
11	Above ten authors	75	1.50
Total		**4985**	**100**

Figure – 2 Authorship pattern of Publications

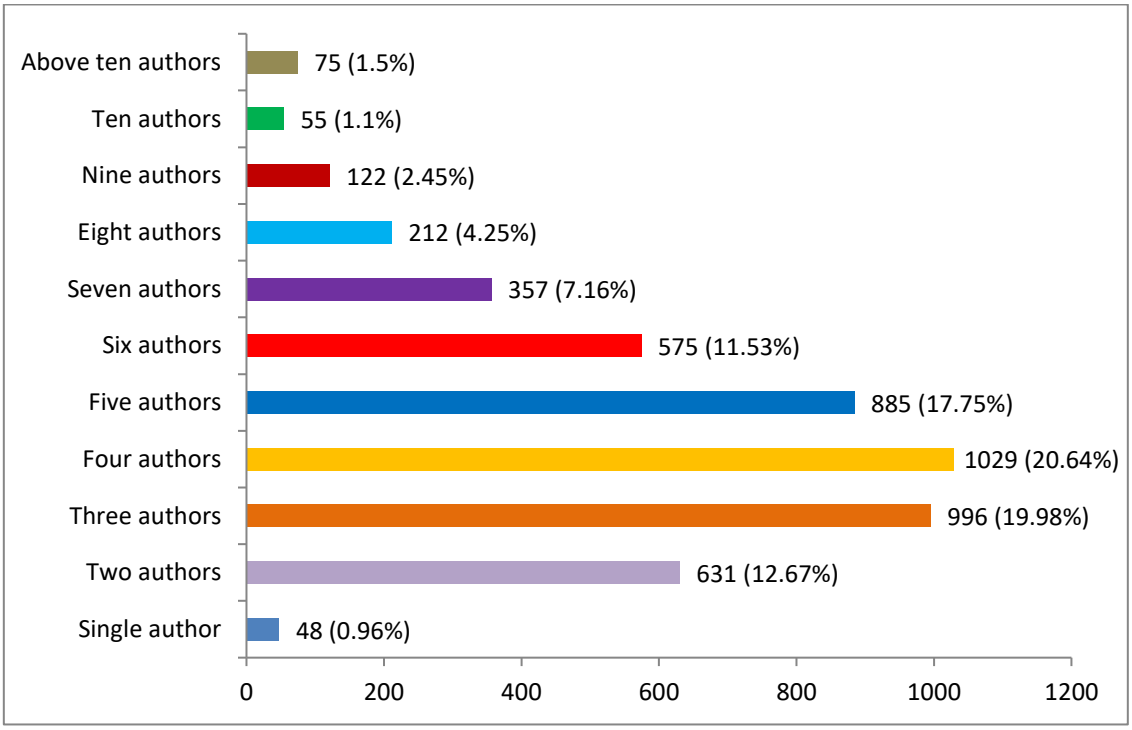

Table 2 and figure2 examine the authorship pattern of publications. Among this authorship, highest number of papers were published in the four authors 1029 (20.64%), followed by three authors 996 (19.98%). Five authors were 885 (17.75%), two authors were 631 (12.67%), six authors were 575 (11.53%), seven authors were 357 (7.16%), eight authors were 212 (4.25%), nine authors were 122 (2.45%), more than ten authors were 75 (1.5%), single authors were 48 (0.96%). This study reveals that the majority of the articles published by four authors 1029 (20.64%).

Table – 3 Single vs. Multi Authors

S. No	Authorship Pattern	Publications	%
1	Single author	48	0.96
2	Multiple Authors	4937	99.04
Total		**4985**	**100**

Figure– 3 Single vs. Multi Authors

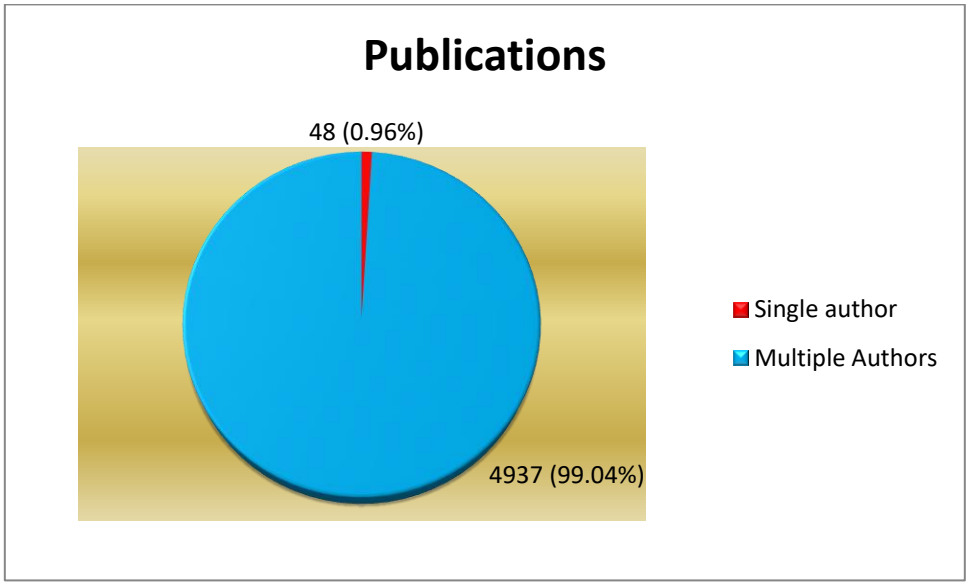

Table 3and figure 3 show that the single author Vs multiple authors of Applied and Environmental Microbiology Journal research output. For the purpose of analysis, the researchers have classified the study two phase viz., first phase Single author and next phase Multi-authors. It is clear from the following that the Single author records are 48 (0.96%) and

multiple authors were 4937 (99.04%). Finally the majority of the articles published in multiple authors in this period from 2001 to 2005.

Table – 4 Prolific author's wise distribution of articles (Top Ten)

S. No	Prolific Authors	Records	%
1	de Vos WM	33	0.98
2	Amann R	30	0.89
3	Lovley DR	26	0.77
4	Fitzgerald GF	25	0.74
5	Abee T	24	0.71
6	Steinbuchel A	21	0.62
7	Hill C	21	0.62
8	Wagner M	21	0.62
9	Tiedje JM	21	0.62
10	Swings J	19	0.56

Table – 4 shows in these analysis 501 prolific authors and 3381 records have produced with 4985 articles. It reveals that de Vos WM 33 (0.98%) is the most productive author contributing Aman R 30 (0.89%) articles followed by Lovley DR with 26 (0.77%) articles. Steinbuschel A, Hill C Wagner M, Tiedje JM were 21 (0.62%) respectively. The lowest production of prolific authors is Swing J 19 (0.56%) of records. And a total of 501 prolific authors is contributed entire research output of the period under study. This study reveals that de Vos WM is the most productive author contributing 33 (1.48%) articles.

Table – 5 Author Productivity (Productivity Per Authors)

S. No	Year	Total no of Papers	Total no of Authors	AAPP	Productivity Per Authors
1	2001	847	3689 (15.95%)	4.36	0.23
2	2002	890	4091 (17.69%)	4.60	0.22
3	2003	1033	4650 (20.11%)	4.50	0.22
4	2004	1009	4812 (20.81%)	4.77	0.21
5	2005	1206	5882 (25.44%)	4.88	0.21
Total		**4985**	**23124 (100%)**	**23.11**	**1.09**

Table 5 shows that the data related to authors productivity. The total average number of author's paper is 23.11 and the average productivity per authors is 1.09. The highest number of authors productivity 5882 (25.44%) was in 2005. The minimum number of authors productivity 3689 (15.95%) was in 2001.

Table – 6 Degree of Collaboration

Year	Single Authored Papers	Multiple Authored Papers	Total(Ns + Nm)	Degree of Collaboration Nm/Ns +Nm = C
2001	11	3678	3689	0.997
2002	10	4081	4091	0.997
2003	13	4637	4650	0.997
2004	7	4805	4812	0.998
2005	7	5875	5882	0.998
Total	**48 (0.21%)**	**23076 (99.79%)**	**23124**	**0.997**

Table 6 shows that the degree of author collaboration in the Applied and Environmental Microbiology Journal. It was calculated using Subramanian's formula. It is found that the degree of author collaboration in journal ranged from 0.997 to 0.998 during the period of 2001 to 2005. In Comparison, where C= degree of collaboration 0.997; Number of Multiple authored works 23076 (99.79%); and Number of single authored works 48 (0.21%).

Table – 7 Collaborative Index (CI)

Year	No. of. Articles	Number of Authors	Collaborative Index (CI)
2001	847	3689	4.36
2002	890	4091	4.60
2003	1033	4650	4.50
2004	1009	4812	4.77
2005	1206	5882	4.88
Total	**4985**	**23124**	**4.64**

Table 7 shows that the distribution of year wise Collaborative Index has been presented in the table. Collaborative Index has been calculated with minimum of 4.36 in 2001 and maximum of 4.88 in 2005. The average Collaborative Index is 4.64.

Table – 8 Exponential Growth rate

S. No	Year	No. of. Publication	Exponential Growth rate
1	2001	847	-
2	2002	890	1.05
3	2003	1033	1.16
4	2004	1009	0.98
5	2005	1206	1.20
Total		4985	4.39

Table 8 shows that Exponential Growth Rate of publications in Applied and Environmental Microbiology Journal during the period of 2001 to 2005 (5 years). The highest growth rate 1.20 was found during 2005 with 1206 publications. Followed by the year 1.16 was found during 2003 (1033) and 1.05 was found during 2002 (890). The lowest growth rate 0.98 was found during 2004 with 1009 publications. It is also found that the Exponential Growth Rate was found to be 4.39 and average growth rate has positive value showing the increasing trend in the Applied and Environmental Microbiology Journal research.

Table – 9 Language wise distributions

S.No	Language	Records	Percent
1	English	4985	100.0

The distribution of Applied and Environmental Microbiology Journal literature by language is shown in table 9 the scholarly communication is effected through English language only used in all the countries. The study concludes that the majority of the articles are published in English Language 4985 (100%).

Table – 10 Type of document wise distribution of Publications

S.No	Document Type	Records	Percent
1	Article	4863	97.6
2	Correction	54	1.1
3	Review	43	0.9
4	Letter	24	0.5
5	Biographical-Item	1	0.0
Total		**4985**	**100**

Table 10 reveals that the type of document wise distribution of publications. It is an accepted fact that most of the scholarly communication of scientific research is published in articles 4863 (97.6%). Followed by Correction 54 (1.1%), Review was 43 (0.9%), Letter was 24 (0.5%), and Biographical-Item was 1. Finally, most of the scholarly communication of scientific research is published in articles 4863 (97.6%).

Table – 11Arithmetic Mean

Year	2001	2002	2003	2004	2005	Total	AM
Total no. of. Articles	847	890	1033	1009	1206	4985	997.0

Table 11shows that the arithmetic mean of the Applied and Environmental Microbiology Journal according to the year of (2001 to 2005). The arithmetic mean value is 997.0 to all the year.

FINDINGS AND CONCLUSION

The publishing trend of a journal completely depends on the efficiency and outline of contributors along with the excellence of research. The AEMJ is one such supposed journal in the grassland of life sciences. The majority of the articles published in the year 2005 ie 1206 (24.2%). The majority of the articles published by four authors 1029 (20.64%). It is clear from the following majority of the articles published in multiple authors in this period from 2001 to 2005. De Vos WM is the most productive author contributing 33 (1.48%) articles. The minimum number of author productivity 3689 (15.95%) was in 2001. The study Comparison, where C= degree of collaboration 0.997; Number of Multiple authored works 23076 (99.79%); and Number of single authored works 48 (0.21%). Collaborative Index has been calculated with minimum of 4.36 in 2001 and maximum of 4.88 in 2005. The average Collaborative Index is 4.64. The study concludes that the majority of the articles are published in English Language 4985 (100%). The study concludes that the majority of the articles are published in English Language 4985 (100%). The study evaluate most of the

scholarly communication of scientific research is published in articles 4863 (97.6%). The arithmetic mean of the Applied and Environmental Microbiology Journal according to the year of (2001 to 2005). The arithmetic mean value is 997.0 to all the year.

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